

REMARKS

Claims 1-24 are all of the claims presently pending in this application.

In addition to the August 19, 2003 Amendment, further claim amendments are made herein to clarify the invention. For at least the reasons set forth in the August 19 Amendment and set forth herein, all of the claims are believed to be in condition for allowance.

A superior effect of the present invention is the reduction of flow resistance during drainage, resulting from the provision of "smaller grooves" at the wall surfaces, as recited in claim 1.

When water is flowing in the grooves (e.g., the circumferential groove 14 and the transverse groove 16) of the tire 10 of the present invention, in the level of the microstructures such as the smaller grooves 22, water in contact with the wall surface is substantially fixed on the wall surface and hardly moves (refer to "A" in Figs. 32-34 appended hereto). On the contrary, water flowing inside the groove generates a significantly "large" vortex therein (refer to "B" in Figs. 32-34). Further, there are generated a number of minute vortexes (refer to "C" in the views) between the fixed water (A) in contact with the wall surface and the large vortex (B), due to a difference in flow rate between the fixed water (A) and the large vortex (B).

In hydrodynamical terms, the area in which the minute vortexes (C) are in contact with the fixed water (A) determines the magnitude of "flow resistance" experienced during drainage. That is, the larger this contact area between the minute vortexes (C) and the fixed water (A) is, the larger flow resistance that results, and the smaller the contact area, the smaller flow resistance that results.

In the present invention, the minute grooves have their pitch and depth set individually within a range of 0.1 to 0.4 mm, as defined in claims, so that a number of minute vortexes are generated along the groove walls, and at the same time, thus generated minute vortexes (C) are effectively prevented from being in contact with the fixed water (A). As a result, in the present invention, the contact area between the fixed water (A) and the minute vortexes (C) is made small, achieving significantly low flow resistance during drainage. This situation is schematically shown in Fig. 34 appended hereto.

On the contrary, in a case in which no such smaller grooves as the present invention are provided at the wall surface, as shown in Fig. 32 appended hereto, the minute vortexes (C) are in direct and wide contact with the fixed water (A) and the flow resistance naturally becomes large.

In a case in which smaller grooves having pitch and depth larger than 0.4 mm are provided at the wall surface, as in Japan '704, the minute vortexes (C) tend to slip into the smaller grooves and, eventually, the contact area between the fixed water (A) and the minute vortexes (C) becomes significantly large, resulting in significantly large flow resistance (refer to Fig. 33 appended hereto).

Note that, in the structure of the present invention shown in Fig. 34, the pitch and the depth of the smaller grooves are carefully designed such that the minute vortexes (C) do not drop into the smaller grooves and thus are hardly in contact with the fixed water (A) on the wall surface. Accordingly, *flow resistance can be made very small* in the present invention.

Applicant respectfully submits that this unique, superior effect of the present invention, which results from the specific range of pitch and depth of smaller grooves (this range of pitch and depth, 0.01 to 0.4 mm, now being more clearly differentiated from the corresponding range of Japan '704) is neither taught nor suggested by the cited art. Accordingly, the rejection under 35 U.S.C. §103(a) should be withdrawn.

Finally, per the Examiner's request, Applicant submits herewith an English translation (extract) of JP '704.

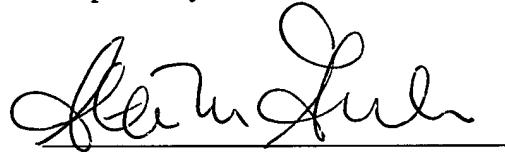
In view of the preceding amendments and remarks, as well as those in the Amendment Under 37 C.F.R. §1.116 filed on August 19, 2003, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If there are any points remaining in issue that the Examiner feels may be best resolved through a personal or telephonic interview, he is kindly requested to contact the undersigned attorney at the local telephone number listed below.

AMENDMENT UNDER 37 C.F.R. §1.114
U.S. SERIAL NO. 09/777,556

ART UNIT 1733
Q62556

A Petition for Extension of Time with appropriate fee accompanies this document. The USPTO is directed and authorized to charge all additional required fees (except the Issue Fee and/or the Publication Fee) to our Deposit Account No. 19-4880. Please also credit any over-payment to said Deposit Account.

Respectfully submitted,



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